

# Cratering History of the Lunar South Pole-Aitken Basin

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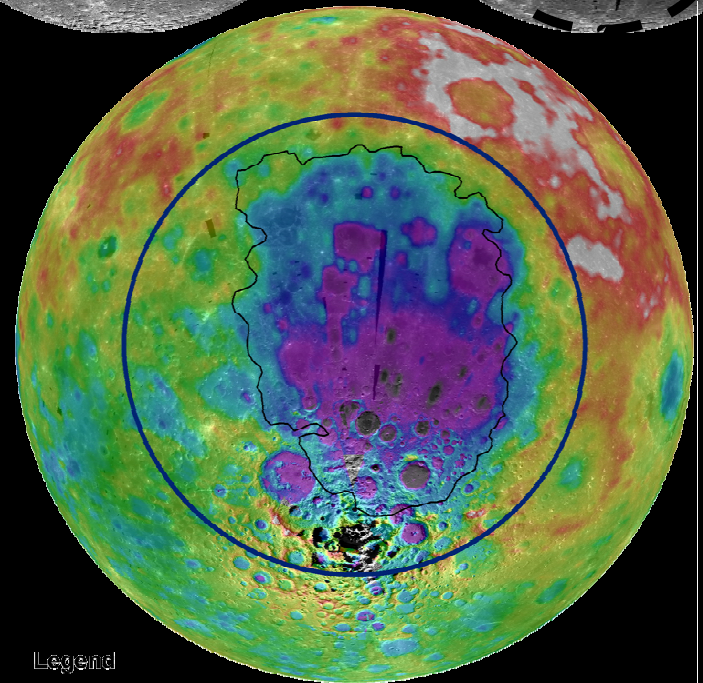
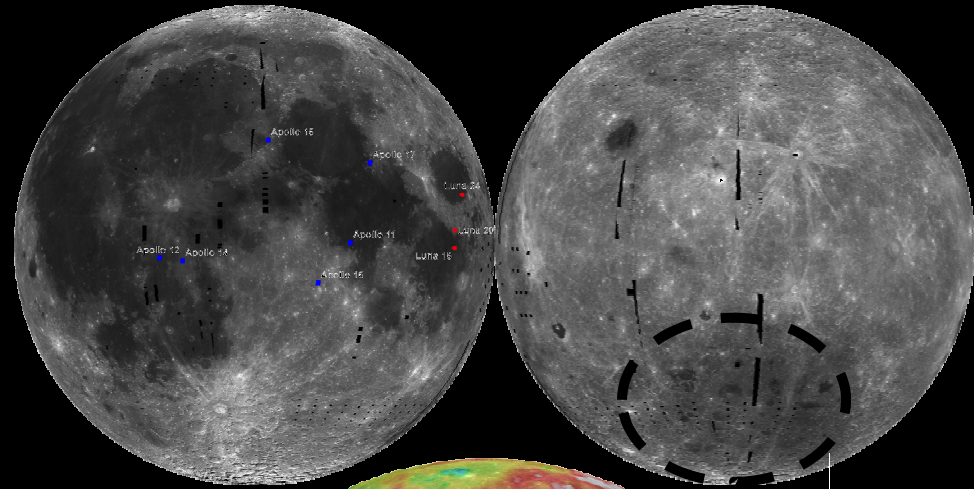
LESWG - April 17<sup>th</sup>, 2008



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# What Makes the South Pole-Aitken Basin Unique?

- SPA is the largest and deepest basin on the lunar surface
- The oldest identified basin
- Material within the basin thought to reflect lower crustal composition



Legend

QuickTime™ and a  
TIFF (Uncompressed) decompressor  
are needed to see this picture.

Jolliff et al.,  
2000

# Three Terranes - Three Stories?

- The Feldspathic Highlands Terrane (FHT) and the South Pole-Aitken Terrane (SPAT) reflect ancient compositions / events
- The Procellarum KREEP Terrane may reflect a single event, the formation of the Imbrium Basin

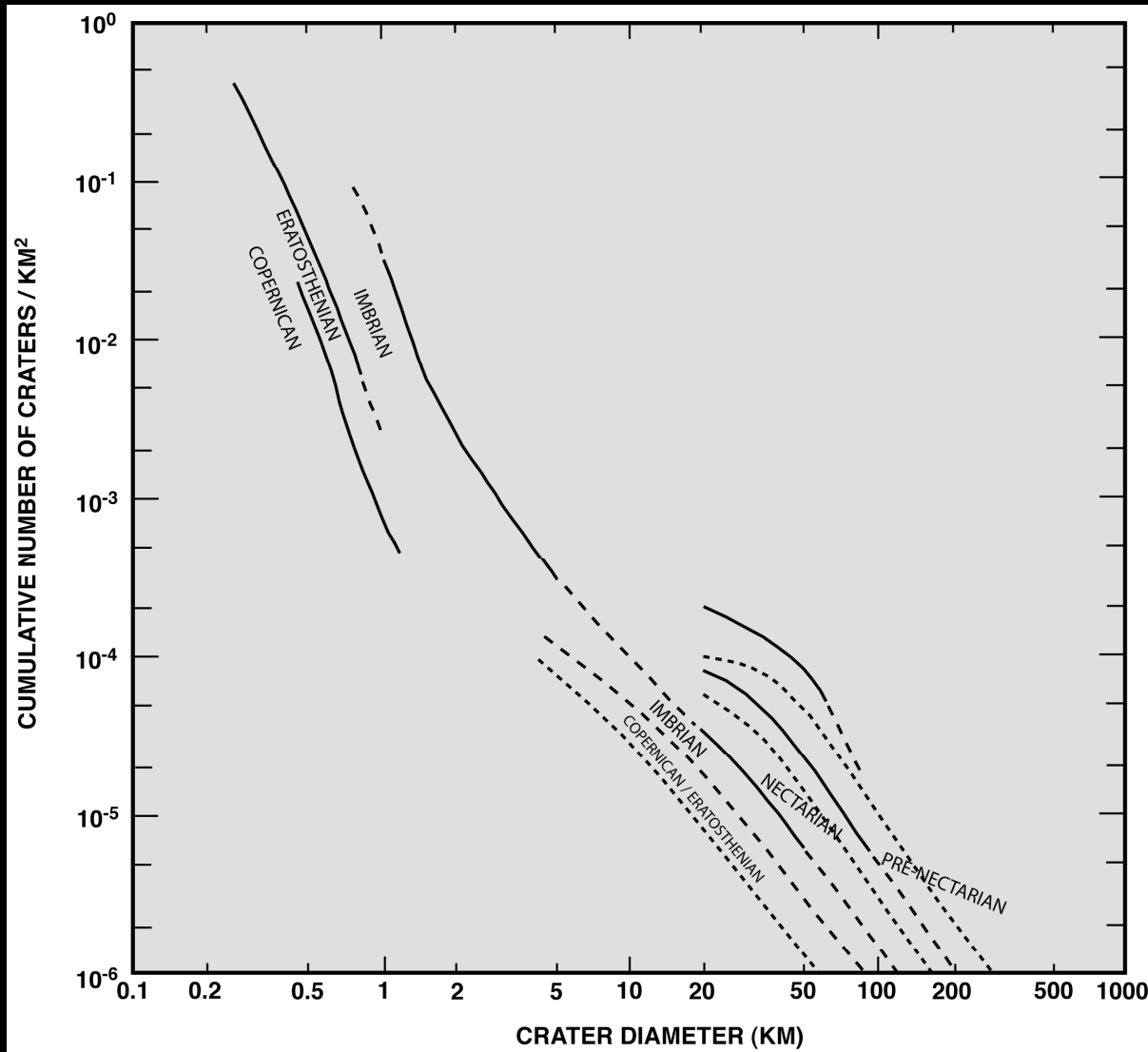
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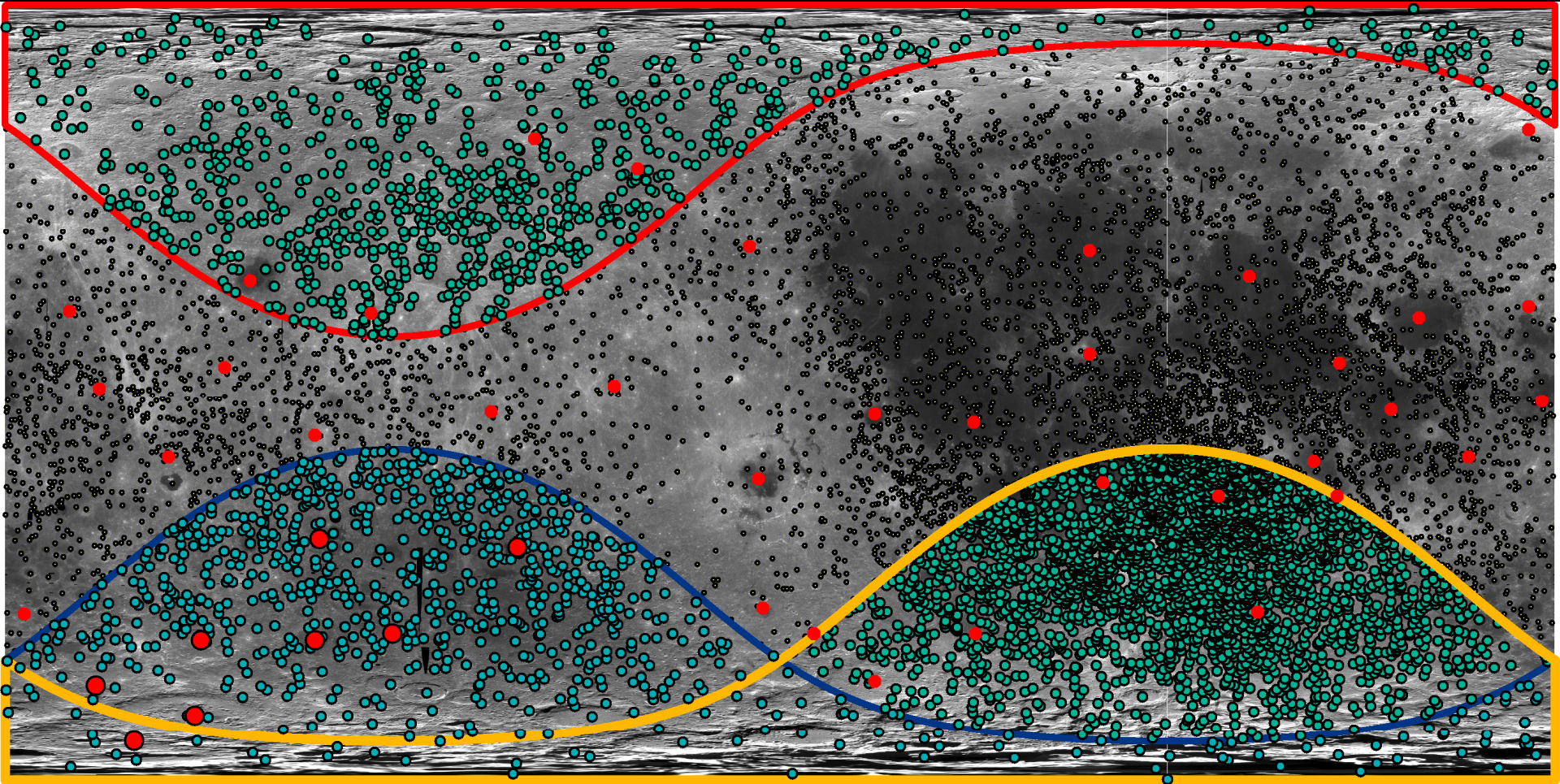
# How Closely Related are the FHT and SPAT?

- The two terranes should be closely related in age
  - The FHT represents the ancient lunar crust, in which SPA formed
- Crater counting on both terranes can suggest “absolute” ages

# Crater Size Frequency Plot

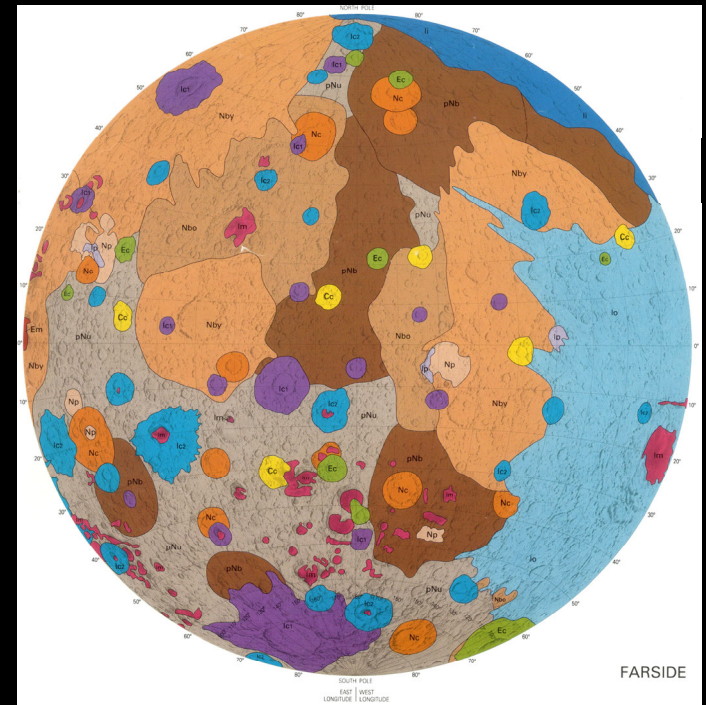


# Identify Craters - Named Craters



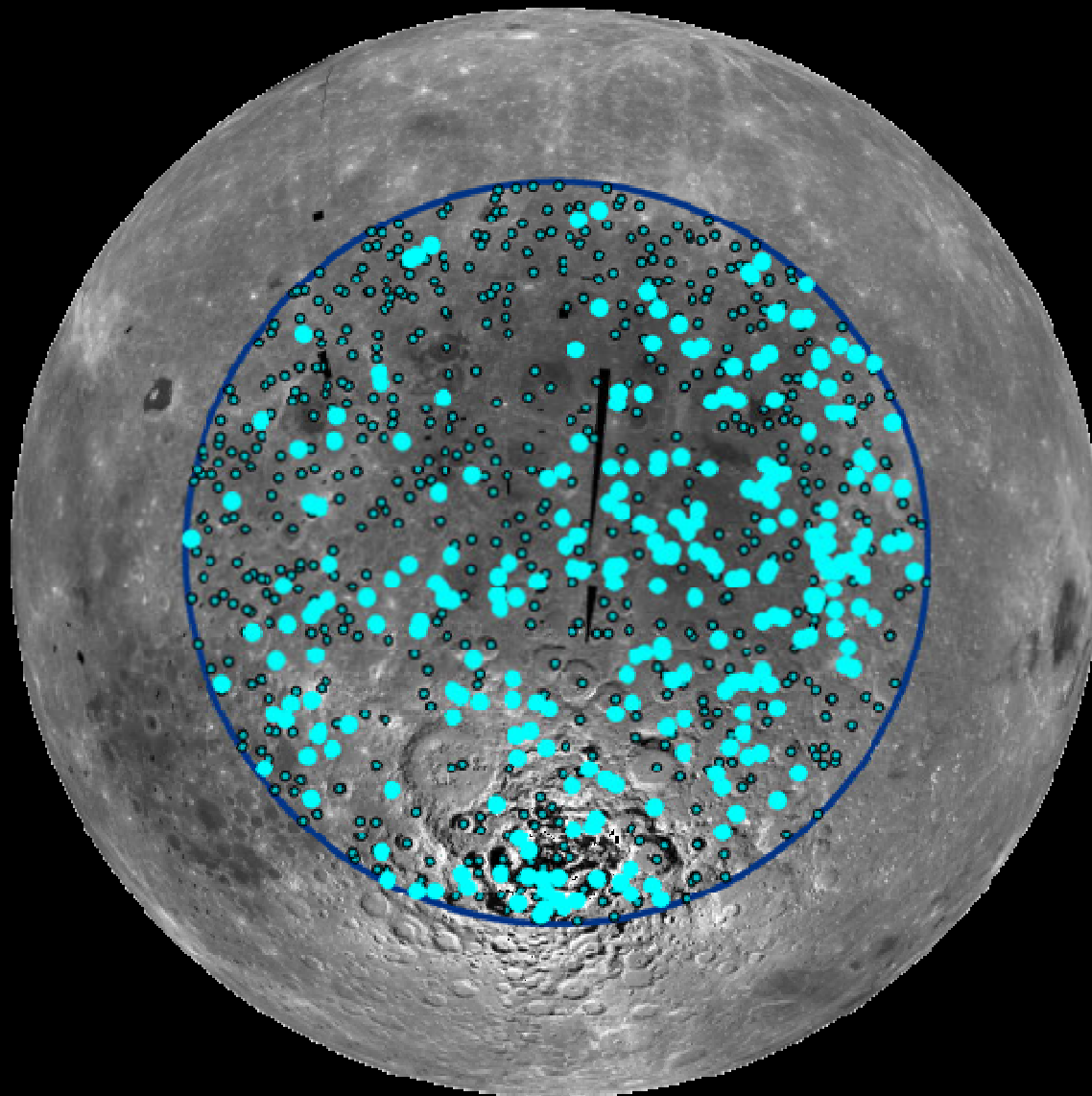
# Why Compare FHT and SPA

- Both suffer from same problem of “named” craters
- Both areas have been mapped as containing ancient surfaces



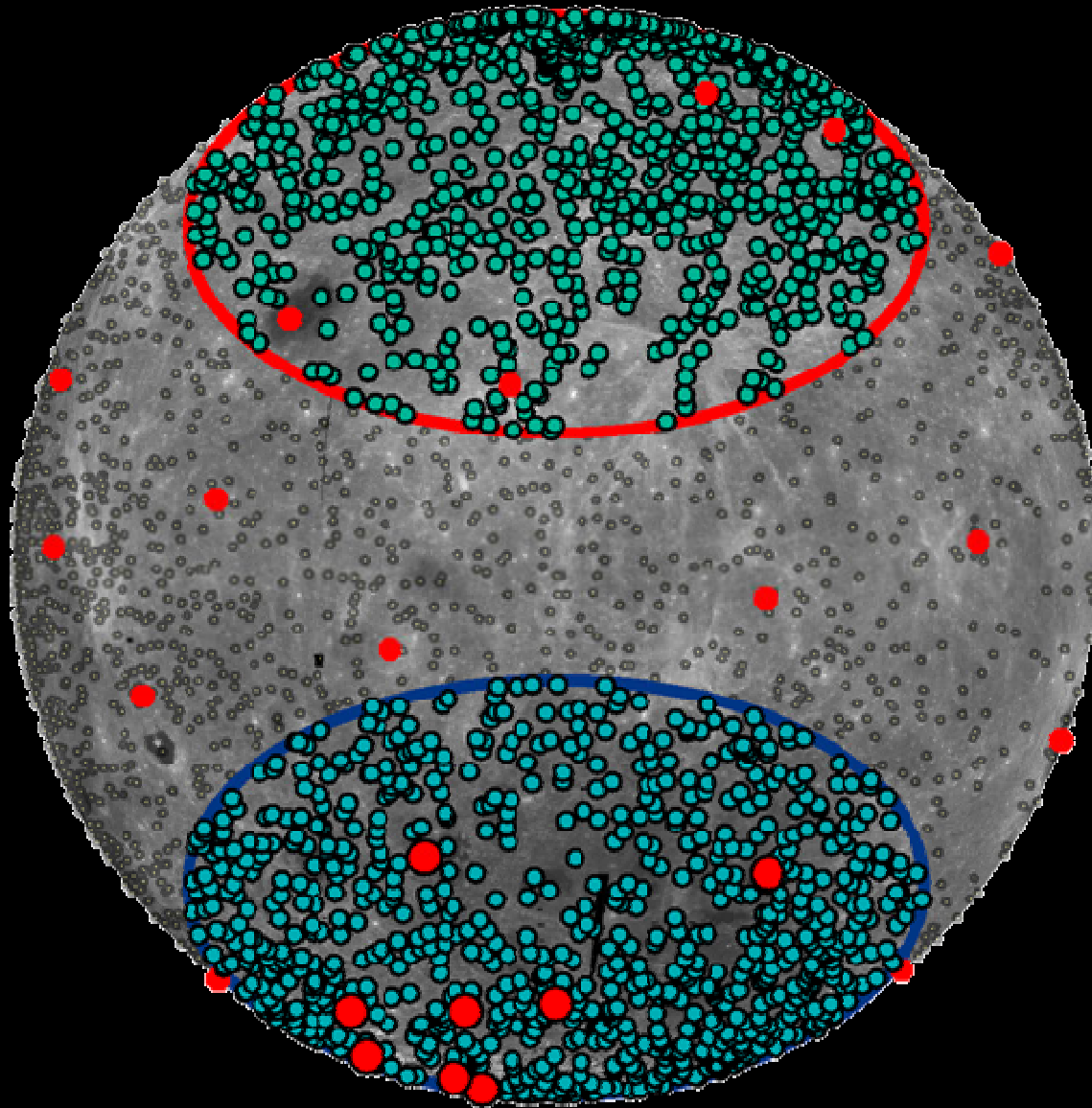


# Identify More Craters

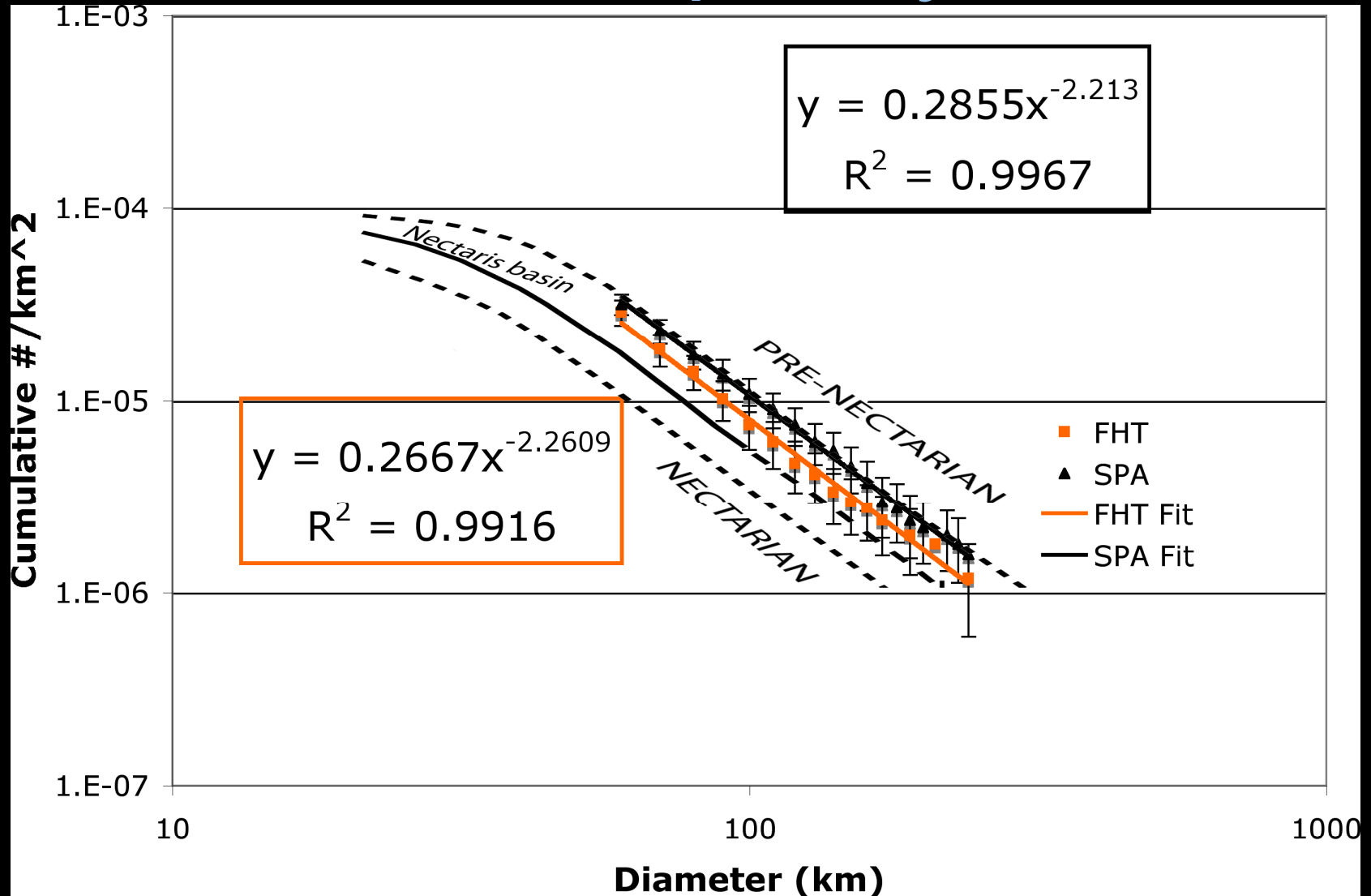




# Compare Regions

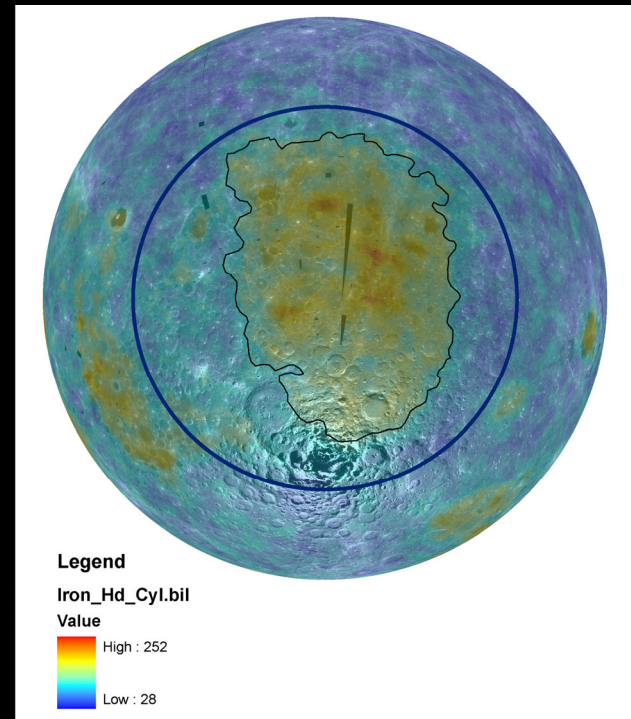
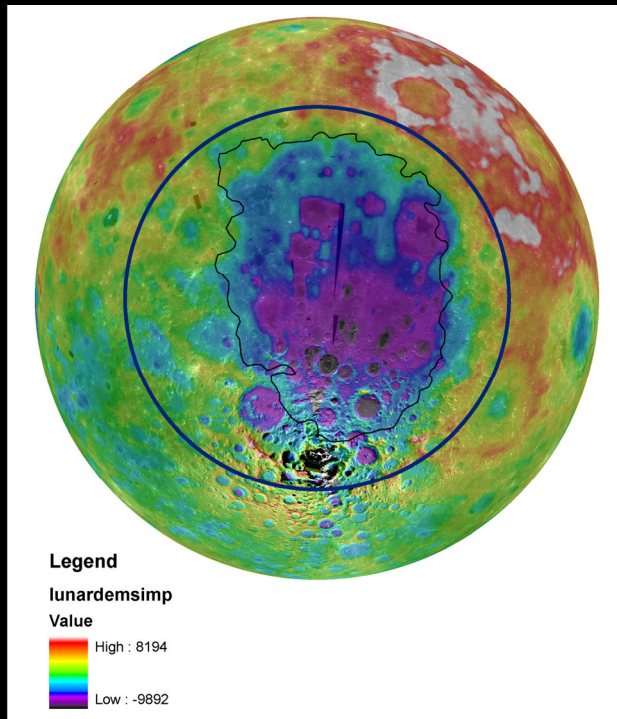


# Crater Frequency Plot

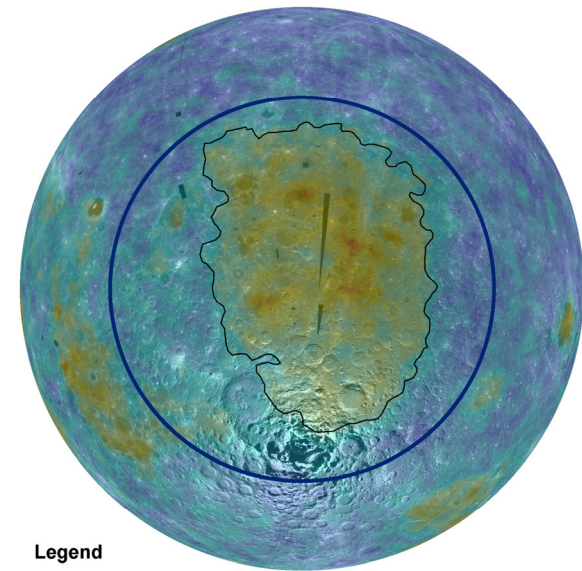


# SPA - How Do You Define It?

- The SPA interior is quite large...
  - Are there large-scale age differences within the basin?



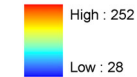
# SPA Subset



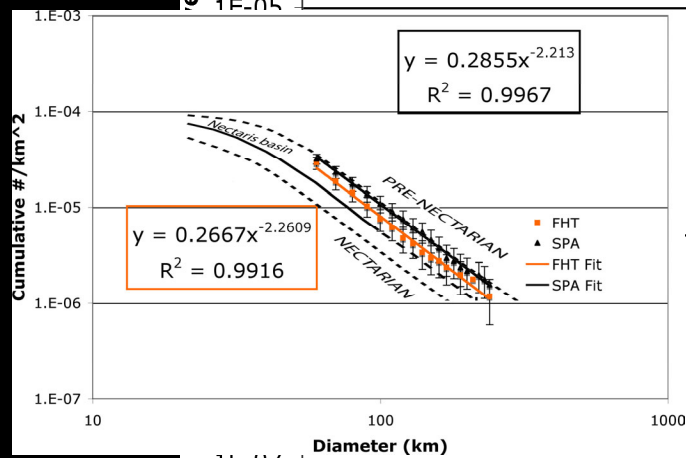
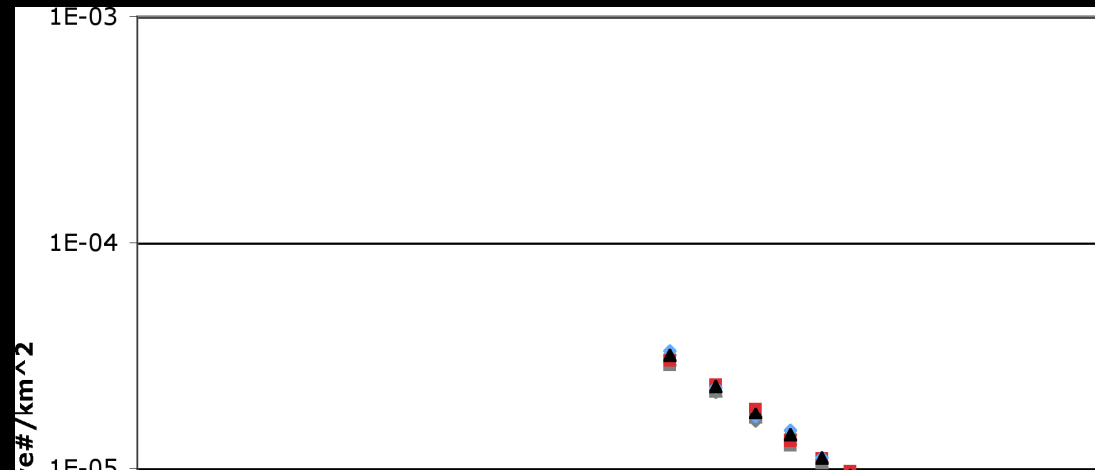
## Legend

Iron\_Hd\_Cyl.bil

Value



- Inside FeDef
- ◆ Outside FeDef
- ▲ SPA



1E-07 /

Diameter (km)

1000

# 1967 - Lunar Orbiter V







# What we don't know about SPA

- When did SPA form?
- How deeply did it excavate?
- Under what conditions did it form?
- What compositions are exposed?
- Where can we sample SPA-rich material?

QuickTime™ and a  
TIFF (Uncompressed) decompressor  
are needed to see this picture.